

APPENDIX II
EXPLANATORY DRAWINGS

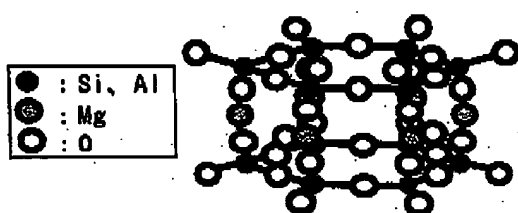
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MECHANISM OF CATALYST SUPPORTING OF PRESENT INVENTION(1)

1) Lattice Defects by Element Substitution

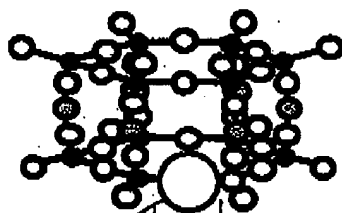
• Formation of lattice defects within cordierite crystal



Normal cordierite has a crystal structure as shown in the left figure



Element substitution
Ex.) Si → Ga



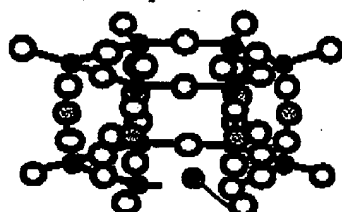
Oxygen defect

About 0.1nm

If among cordierite-composing elements, for example, Si (4⁺) is substituted by Ga (3⁺), an oxygen defect is formed as shown in the left figure. The size of oxygen defect is about 0.1nm.



Catalyst support



Catalyst noble metal ion

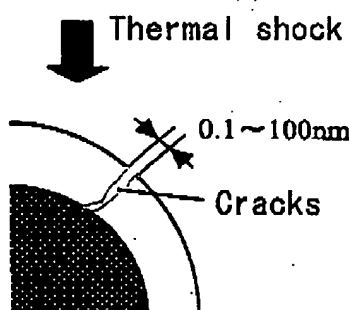
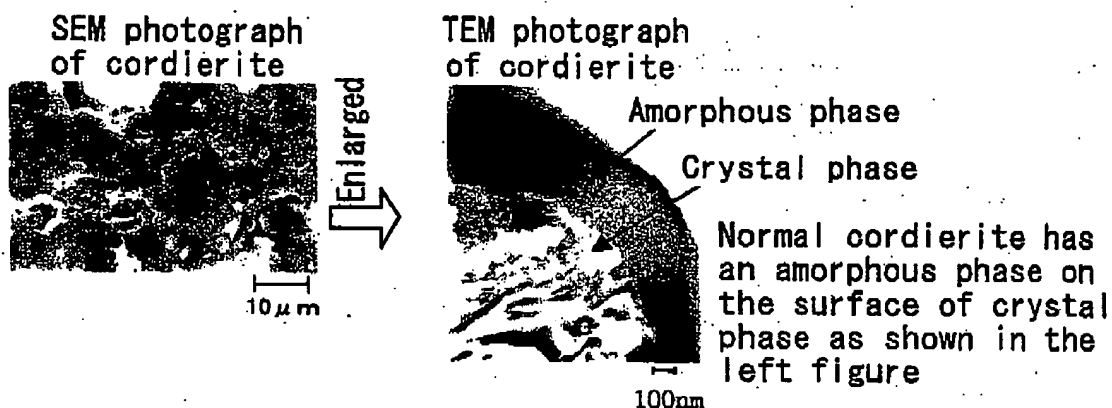
If a catalyst component is supported on a cordierite having an oxygen defect, the catalyst ion is supported at the oxygen defect, which is fired to become a catalyst metal

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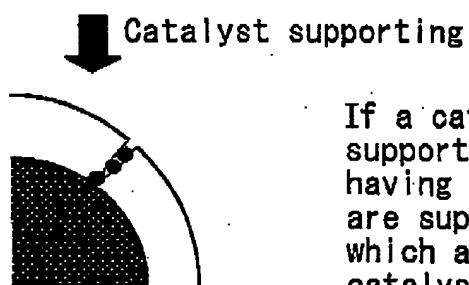
MECHANISM OF CATALYST SUPPORTING OF PRESENT INVENTION (2)

2) Fine Cracks

• Formation of Cracks (fine cracks) in glass phase



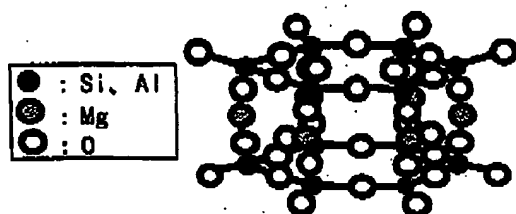
Giving thermal shock provides thermal stress due to difference in thermal expansion coefficient between amorphous and crystal phases, to form fine cracks, having a size in a range of 0.1-100nm



If a catalyst component is supported on a cordierite having fine cracks, catalyst ions are supported on fine cracks, which are fired to form a catalyst metal

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MECHANISM OF CATALYST SUPPORTING OF PRIOR ART

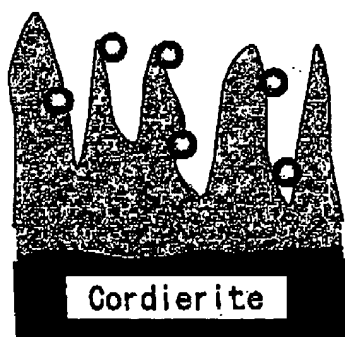


Normal cordierite has a crystal structure as shown in the left figure and does not have points to support a catalyst component



The left figure shows the surface of cell wall of a monolith support body, having a smooth surface for the catalyst component, so that there are no points to support a catalyst

↓ Catalyzed



By forming a γ -alumina layer having a large specific surface area on the surface of cordierite, a catalyst component is supported on the γ -alumina layer

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